substantially two equal areas. First arcuate pressure surface **270** has curvature less than the curvature of pressure surface **272**. Generally, the curvature of pressure surface **272** is twice the curvature of pressure surface **278**. In preferred embodiments shown in FIG. **11**, first arcuate pressure surface **270** has a curvature defined by an 18° arc. Second arcuate surface has a curvature defined by a 36° arc.

Pressure plates **166** include a leading edge **171** (FIG. **12**) having tongue or ridge **173** extending the full length of the pressure plate. A trailing edge **175** of pressure plates **166** include a groove **177** complementing ridge **173** and extending the length of the pressure plate. Preferably, groove **177** is dimensioned to allow limited movement of ridge **173** therein. Groove **177** is adapted for mating with a ridge **173** of an adjacent pressure plate, as shown in FIGS. **12** and **13**.

In an alternative embodiment shown in FIG. **8**, pressure plate **166'** has two arcuate faces **270'**, **272'** joining along a diagonal line. Arcuate face **270'** is defined by 18° arc while arcuate face **272'** is defined by a 36° arc. Upper and lower gears **266'** and **268'** are fixed to pressure plate **166'** and function in the same manner as the embodiment of FIG. **7**.

Referring to FIG. **5**, upper axial shaft **262** of pressure plate **166** extends beyond spur gear **266** to define a mounting pin **274**. Lower axial shaft **264** similarly extends beyond spur gear **268** to define a lower mounting pin **276**. Upper and lower mounting pins **274'**, **276**, respectively, are received in apertures **278** in an upper mounting plate **280** and in aperture **282** in a lower mounting plate **284**. Upper and lower mounting plates **280**, **284** are coupled to casing **162** to fix the radial position of pressure plates **166** within pump assembly **14** as shown in FIG. **5**. The mounting plates can be made of metal or a suitable plastic material.

An upper ring gear **286** encircles each of upper spur gears **266**. Ring gear **286** includes internal gear teeth **288** which mesh with the teeth on spur gears **266**. Outer gear teeth **290** are also provided on the outer edge of ring gear **286**. As shown in FIG. **14**, an essentially identical lower ring gear **292** having inner gear teeth **294** meshes with lower spur gears **268**. Low ring gear **292** also includes outer gear teeth **296** for meshing with tower gears **312**.

As shown in FIG. **5**, the upper and lower ends of body **242** of casing **162** include a recess **298**, **300**, respectively. Top **240** of casing **162** includes a recess **302** opposite recess **298**. Bottom **244** of casing **162** also includes a recess **304** opposite recess **300**. An upper tower gear **306** having an upper pinion **308** and a lower pinion **310** is mounted in recesses **298**, **302** for rotational movement. Upper tower gear **306** meshes with upper ring gear **286**. A lower tower gear **312** having an upper pinion **314** and a lower pinion **316** is rotatably mounted in recesses **300**, **304** for meshing with lower ring gear **292** as shown in FIGS. **5** and **14**. As shown in FIG. **5**, upper and lower tower gears **306**, **312** are mounted along the same axis and extend through mounting plates **280**, **284** and into top **240** and bottom **244**, respectively.

A drive motor **318** having an axially extending upper drive shaft **320** and a lower drive shaft **322** is mounted to body **242** of casing **162**. An upper drive gear **324** is mounted on upper drive shaft **320** meshing with upper tower gear **306**. A lower drive gear **326** is mounted on lower drive shaft **322** meshing with lower tower gear **312**. A suitable housing **328** encloses drive motor **318** and is attached to casing **162** by suitable fastening means (not shown).

Referring to FIGS. **12** and **13**, helical teeth **174** of impeller **168** are closely spaced to pressure plates **166** which encircle impeller **168**. Pressure plates **166** are each mounted on upper and lower mounting plates **280**, **284** for limited pivotal movement as determined by the position of upper and lower ring gears **286**, **292** with respect to upper and lower mounting plates **280**, **284**. Rotation of impeller **168** in the direction of arrow **330** creates a high pressure zone along first arcuate face **270** and a low pressure zone along second arcuate face **272**. Fluid material passing along helical teeth **174** of impeller is forced from the high pressure area of arcuate face **270** toward arcuate face **272**. The relative position of each pressure plate **166** with respect to impeller **168** determines the pump pressure and output flow.

As shown in FIG. **12**, pressure plates **166** are adjusted by rotating the ring gears to pivot pressure plates **166** so that arcuate face **270** is closely spaced to impeller **166** and arcuate face **272** is spaced away from impeller. In this position of the pressure plates **166** shown in FIG. **12**, the pressure zone created at arcuate face **270** is significantly higher compared to the pressure zone at arcuate face **272** resulting in a high output flow. Adjusting the position of pressure plates as shown in FIG. **13** reduces the pressure difference between the pressure zones at arcuate faces **270**, **272** thereby creating a lower output flow. By selectively adjusting the position of pressure plates, the output flow of material can be controlled while maintaining a constant rotational speed of impeller **168**. Drive motor **318** is preferably a step motor coupled to controller **18**. Drive motor **318** can be rotated in controlled increments to permit small adjustments of the position of pressure plates **166**.

During initial start up of the apparatus, supply container **12** is positioned on the pump assembly **14**. Controller determines the type of material in supply container **12** and selects an operating program for the material to be pumped. Controller then actuates vacuum apparatus **90** to draw a vacuum and draw material from supply container **12** into pump assembly **14**. Substantially simultaneously, controller energizes electromagnetic winding **164** to cause impeller **168** to rotate at a selected constant speed. Drive motor **318** is actuated to position pressure plates **166** to determine output flow from pump assembly **14**.

The material being pumped flows downwardly through throat tube **76** into rotating cone **212**. The rotational movement of inlet cone **212** forces the material downward along the inclined walls of cone **212** through openings **208** in upper magnetic plate **202**. The rotation of impeller **168** forces the material downwardly into upper recess **178** and outward through radial passageways **188** to pressure plates **166**. Pump pressure formed between impeller **168** and pressure plates **166** force the material downwardly and through passageways **200** into lower recess **192** where the material exits through conical outlet **238** and outlet **174**.

The pump assembly of the invention is particularly suitable for pumping various viscous materials, such as, for example, wallpaper adhesives, floor adhesives and wallboard joint compound. In one preferred embodiment, the material being pumped is a wallboard joint compound having an improved dry time and reduced shrinkage compared with commercially available joint compounds.

The joint compound of the invention is a water based composition which contains pure gypsum plaster, an aliphatic resin glue and sufficient water to form a workable mixture. The joint compound is defined as having an absence of added alcohol such as polyvinyl alcohol or methanol and an absence of abrasive fillers such as silica, alumina or mica. Various additives can be added to improve texture, color and drying times. In embodiments, the joint compound consists essentially of pure gypsum plaster, an aliphatic resin glue and water.